DOCUMENT RESUME

ED 036 852 CG 005 105

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TITLE Improving the Identification of Anxious Elementary School Children Through the Use of An Adjusted Anxiety Scale.
INSTITUTION New York State Education Dept., Albany. Bureau of School and Cultural Research.
PUB DATE [70]
NOTE 19p.

EDRS PRICE EDRS Price MF-$0.25 HC-$1.05
DESCRIPTORS *Anxiety, *Elementary School Students, Identification Tests, *Measurement Instruments, *Measurement Techniques, Pupil Personnel Services, *Rating Scales

ABSTRACT

The report summarizes the results of a study of comparative validities of procedures for identifying the anxious elementary school child by using a questionnaire measure of school anxiety, the Test Anxiety Scale for Children (TASC). The data are based on the responses of 165 sixth graders from two school systems in southwestern New York State, who participated in a separate study involving programed learning and 77 sixth graders (40 boys and 37 girls in four sixth grade classes from the same schools as the programed group), who served as controls. Five tests were administered with two week intervals between administrations: (1) The TASC, (2) The Lie Scale for Children (LSC), (3) a verbal creativity battery composed of four subtests: imagination, flexibility, originality and fluency; (4) the Lorge-Thorndike IQ Test, and (5) an achievement test specially constructed for the programed learning study to measure knowledge of the learning material taught in a programed booklet. The major finding of the study shows that when the predictive validities of the TASC and the adjusted test anxiety scale for children (a composite score of the LSC score and the TASC scale for children score) were compared against the academic criteria the adjusted test anxiety scale for children score resulted in substantial increases in prediction. (Author/MC)

ED036852

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Improving the Identification of Anxious Elementary School Children Through the Use of An Adjusted Anxiety Scale

by

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The present report summarizes the results of a study of the comparative validities of procedures for identifying the anxious elementary school child through the use of the Test Anxiety Scale for Children, a questionnaire measure of school anxiety. The need for turning the attention of the counselor and the pyschologist to procedures for the identification and treatment of the school anxious child is well founded in research. For example, a number of studies of anxiety in school children have indicated a negative relationship between anxiety and indexes of school achievement as well as a variety of other indexes of intellectual performance (I.G. Sarason, 1960; Ruebush, 1963; Hill and Sarason, 1966). Relatively recent reviews indicate that the negative relationship between anxiety and achievement test or intelligence test performance exists at all elementary grade levels (Sarason et al., 1960; Ruebush, 1963) and at the high school and college levels (I.G. Sarason, 1960; O'Reilly, 1966). While there are a few exceptions to this general trend (Kerrick, 1956; Ruebush, 1963; Wirt and Broen, 1956), and the extent of the negative relationship varies from study to study (Ruebush, 1963; O'Reilly, 1969), recent longitudinal studies (Sarason, Hill and Zimbardo, 1964; Hill and Sarason, 1966) showed that the negative relationship between anxiety and achievement test performance increased over the school years, was highest with test scores involving verbal skills and was unexpectedly high when achievement levels were examined for students with very high test anxiety and defensiveness scores. In this case, achievement differences between high and low anxious students (with other differences controlled) were as high as two to three years in grade equivalent reading scores.

Although studies of anxiety in the school setting have generally

shown a negative relationship between anxiety and test performance, and this relationship has at times appeared to have considerable practical significance (Hill and Sarason, 1966), the great bulk of studies have generally yielded low correlations between questionnaire anxiety and indexes of test performance. In fact when intelligence is partialled out, the relationship between anxiety and test performance may be nonexistent (cf. Jones, 1961; O'Reilly, 1966). The lack of general practical significance in studies of anxiety and intellectual performance is probably one of the major factors accounting for the lack of attention given in the school setting toward systematic identification and treatment of the child suffering from debilitating anxiety.

Recent research (Phillips, 1966) suggests that one of the major reasons for the low validity coefficients obtained in questionnaire studies of children's anxiety is the tendency for some children to lie, or be defensive, thus depressing their "true" scores on questionnaire measures of anxiety. Fortunately, procedures are available for measuring the lie tendency, with one of the most widely used being the Lie Scale for Children (LSC), developed by Sarason et al. (1960) for use in conjunction with the Test Anxiety Scale for Children (TASC). Unfortunately, ambiguity concerning the meaning of defensiveness, as measured by the LSC, apparently has prevented a consistent and constructive use of the scale in research and practice relating to children's anxiety.

Analysis of the content of the LSC reveals that it is composed of a relatively homogeneous group of items referring to common or universal anxiety experiences (e.g., "Do you ever worry?"), which it is presumed nearly all children experience.. Positive admission to the items indicates

both honesty and recognition of internal anxiety. Negative responses, it was reasoned, denoted the individual tends to avoid public recognition of internal anxiety. It was further assumed that this tendency was present in responding to the TASC items as well, thus resulting in an underestimate of the individual's "true" anxiety score.

A procedure for determining the hypothesized depressive effect of LSC scores on the child's "true" anxiety score did not suggest itself in the literature. Hill and Sarason (1966), in their longitudinal study of anxiety and defensiveness in children, concluded that TASC and LSC responses were qualitatively different, but had similar and additive effects on achievement. However, in their analyses, the invalidating effect of LSC scores was partialled out of the TASC-achievement correlation. Other investigators (Sarason et al., 1960) have simply used the LSC as a basis for discarding questionable anxiety scores. Given the ambiguity in both the meaning and use of LSC scores as a background, the procedures used for estimating an individual's "true" anxiety score in the current study were thus tentative and exploratory.

Method

Data for the study were based on the responses of 165 sixth graders who participated in a separate study involving programed learning and an additional 77 sixth graders who served as their controls. The programed sample comprised 80 boys and 85 girls in nine sixth grade classes from two school systems in Southwestern New York State. The nonprogramed sample comprised 40 boys and 37 girls in four classes in the same two school systems as the programed group. For the study, the programed and nonprogramed groups were combined or treated separately, depending upon whether

they had common test scores for the analyses.

With the Exception of a pretest only administration of the Lorge-Thorndike IQ Test (Level III-Form A), the programed subjects were administered the following tests as pretests and post tests, with a two week interval between administrations:

1. The Test Anxiety Scale for Children (TASC).
2. The Lie Scale for Children (LSC).
3. A verbal creativity battery composed of four subtests named: imagination, flexibility, originality, and fluency (Dacey and Ripple, 1965).
4. The Lorge-Thorndike IQ Test (Level-III, Form A).
5. An achievement test specially constructed for the programed learning study to measure knowledge of the learning material taught in a programed booklet, Latitude and Longitude (Coronet, 1962).

The nonprogremed Ss received the same test administrations as the programed Ss, with the exception that the achievement test was not given. Relibilities of the test scores for the programed sample were: (1) .91 (split-half) and .75 (two-week, test-retest) for the criterion test; (2) .66 (two-week, test-retest) for TASC (adj.) scores; and (3) .39 for imagination, .55 for flexibility, .59 for originality, and .65 for fluency (all two-week, test-retest). Intrascorer stability coefficients for the creativity tests ranged from .68 to.97.

The initial scoring procedure examined in the study involved combining the S's TASC and LSC scores with the latter score weighted so that it was as important as the TASC in determining the estimate of the S's "true" anxiety score. The weighting procedure was necessitated by the fact that LSC scores are generally very low (Sarason et al., 1960), and the means and variances of the TASC and LSC are radically different. Equal weighting was

accomplished by converting both TASC and LSC scores to standard scores and then adding the standardized TASC and LSC scores for individuals into a composite score termed the "adjusted TASC" score /¯ TASC (adj.) ¯/.

To determine whether increases in predictive validity were thereby obtained, TASC scores were compared using two types of criteria. First, TASC and TASC (adj.) scores were correlated with children's IQ, achievement, and verbal creativity test scores, with the intent of comparing differences in the predictive validities of the two scores for these criteria. TASC theory predicts that anxiety interferes with performance on complex tests such as measures of achievement and intelligence (Sarason et al., 1960) and that the anxious child is less creative than the non-anxious child (Ruebush, 1963; Sarason et al., 1960). A further test of the validity of the TASC (adj.) score was made by comparing the adjusted and unadjusted scores with teachers' rankings of observed levels of children's anxiety.

In additional analyses, an attempt was made to ascertain whether the prediction of achievement could be further increased by optimally weighting TASC and LSC scores, using multiple regression analyses. The major considerations were:

1. Is equal weighting of TASC and LSC scores the optimal procedure for predicting achievement?

2. Would a multiplicative interaction of TASC and LSC scores receive a significant weight in conjunction with the independent weights for the TASC and LSC?

3. Since TASC (adj.) scores correlate more highly with IQ than TASC scores, does the TASC (adj.) contribute anything more to achievement than the TASC when IQ is included as a predictor?

These questions were suggested in part by an initial analysis in which relationships among the TASC, LSC, and achievement scores were examined graphically in order to ascertain whether the data corresponded to the initial notion that the LSC was an indirect measure of anxiety. The graphical analyses will also be presented since they suggest that interpretation of LSC scores as an indirect indicator of anxiety per se should be modified.

Results

The major results of the study are given in the form of conclusions, supplemented by tabular presentations.

1. Relative Predictive Validities of TASC and TASC (adj.) Scores for Academic Criteria--As shown in Table 1, the TASC (adj.) score was effective in adjusting for the invalidating effect of denial on the correlations of TASC scores with achievement and IQ. Approximately 11 percent of the variance of achievement was predictable from the TASC alone; the TASC (adj.) increased the degree of prediction to 26 percent. The Corresponding results for IQ were 8 percent for the TASC score and 21 percent for the TASC (adj.) score. Both increases in prediction were highly significant ($p < .005$)[1] The results shown in Table 1 also tend to indicate that TASC (adj.) scores are more predictive of creativity test scores, relative to

[1]Differences between correlations were evaluated using one-tailed t tests for nonindependent r's (Edwards, 1963, p. 85).

[2]For partial r's, the formula given by McNemar (1962, pp. 164-167) was used.

TASC scores. However, when IQ was partialled out of the correlations between TASC (adj.) scores and the creativity test scores, all correlations were then nonsignificant ($p > .05$).[2]

Table 1

Comparisons of the Predictive Validities of TASC and TASC (adj.) Scores for Three Types of Academic Criteria

Dependent Variables	Independent Variables: TASC	Independent Variables: TASC (adj.)	Increase Predicted $\underline{S}^2$
Pre-Achievement	-.35*	-.51**	14%
Post-Achievement	-.33[a]**	-.52**	16%
IQ	-.28**	-.46**	13%
Pre-Imagination	-.18**	-.21	1%
Pre-Flexibility	-.01	-.06	1%
Pre-Originality	-.08	-.19*	3%
Pre-Fluency	-.04	-.15*	2%

[a]Underlined correlations based on N=165; remaining correlations based on combined groups, N=242.

*P <.05 (one-tailed test).

**P <.005 (one-tailed test).

2. TASC (adj.) and TASC Scores in Relation to Teacher Rankings of Children's Anxiety--The results of the predictive validities of TASC and TASC (adj.) scores for anxiety ranks of Ss shown in Table 2, were somewhat equivocal. There was a slight but significant tendency for teachers to attribute anxiety to Ss on the basis of both their TASC and LSC scores, and the TASC (adj.) score showed some slight superiority over the TASC score in the ability to predict teacher rankings of children's anxiety

levels. Significant increases in prediction for TASC (adj.) scores were obtained in the cases of teacher 1 (t = 2.19, $p<.05$; two-tailed test) and teacher 10 (t = 17.15, $p<.001$, two-tailed test).

Table 2

Spearman Rho Correlations Between Teachers' Anxiety Rankings and Children's LSC, TASC, and TASC (adj.) Ranks

Teacher[a]	N	LSC	TASC	TASC (adj.)
1	19	.49*	.05	.61***
2	21	-.02	.05	-.06
3	18	.30	.41*	.45
4	25	.11	.41*	.34*
5	20	.19	.57**	.72***
6	19	-.06	.07	-.02
7	15	.57*	.47*	-.65***
8	14	-.34	.33	.03
9	14	-.50*	.22	-.40
10	23	.54**	-.18	.24
11	22	.24	.60***	.52**
12	16	.00	.35	.14
13	16	.29	-.21	.19
Average[b] r	242	.15*	.26**	.26**

[a]A rank of one indicated the highest level of anxiety in each class; signs were reversed to make the table more interpretable. A positive correlation, therefore, indicates correspondence between children's TASC ranks (high to low anxiety) and teachers' ranking of the same children on anxiety (high to low anxiety). Note that some teachers ranked in reverse of the rank order indicated by TASC scores. In these cases, the results of the ranking were checked with the teachers, but no changes were indicated.

[b]Fisher's z transformation was used to compute the average r's

*p <.05 (one-tail).

**p <.01 (one-tail).

***p <.005 (one-tail).

3. The results of the regression analyses summarized in Table 3 indicated that the degree of prediction of

Table 3

Multiple Correlations and Standardized Beta Weights for Three Stepwise Regressions[2]

Stepwise Regressions 1

Step	R	R^2	B-TASC	B-LSC	B-TASC x LSC
1.	.335	.112	-.335***		
2.	.525	.276	-.467***	-.426***	
3.	.548	.301	-.473***	-.489***	-.169**

Stepwise Regressions 2

Step	R	R^2	B-IQ	B-TASC	B-LSC	B-LSC x TASC
1.	.744	.554	.744***			
2.	.756	.572	.706***	-.139**		
3.	.773	.597	.638***	-.214***	-.181**	
4.	.779	.607	.626***	-.222***	-.225***	-.107*

Stepwise Regressions 3

Step	R	R^2	B-IQ	B-TASC (adj.)	B-TASC x LSC
1.	.744	.544	.744***		
2.	.772	.596	.638***	-.232***	
3.	.779	.607	.626***	-.262***	-.106*

[1] N = 165

* .05> p> .02

** .02> p >.01

*** p <.001

achievement attained through the use of the TASC (adj.) score was equivalent to that obtained when the TASC and LSC received optimal weights and IQ and the TASC x LSC interaction were included as predictors. The TASC x LSC interaction served as a suppressor, improving the predictive validity of LSC scores, although the increase in predition attained had little practical significance. (See regression 1). When IQ was included as a predictor, (See regression 2) the increase in degree of prediction of achievement was from 57.2 percent (TASC) to 59.6 percent for the TASC (adj.) score. The TASC score by itself accounted for less than 2 percent of predicted achievement variance, over and above that predicted by IQ alone, while that for the TASC (adj.) was approximately 5 percent. (Compare regressions 2 and 3).

4. The TASC (adj.) score gives a weight of roughly 3.33 to appropriate responses to the LSC as compared to a weight of 1 for appropriate TASC responses. The practice of discarding anxiety scores of high liars (Sarason et al., 1960; Traweek, 1964) therefore results in a loss of meaningful data in studies of anxiety and intellectual performance in children. Another procedure used in some studies (Sarason, Hill, and Zimbardo, 1964; Hill and Sarason, 1966) involves partialling out the invalidating effect of LSC scores on the correlation between anxiety and achievement. This procedure is not equivalent to the degree of prediction of achievement attained through the use of optimal weights for the TASC and LSC or the adjusted anxiety score. The partial correlation of TASC

scores and achievement is -.456 (LSC partialled out) with a r^2 of -.208, whereas the data presented in Table 3 shows that the combined partials of -.467 for TASC scores and -.426 (standardized partial regression coefficients) for LSC scores resulted in an R^2 -.276 with achievement. The corresponding r^2 for TASC (adj.) scores was .27.

Another major objective of the study was concerned with an attempt at illuminating the psychological meaning of the adjusted anxiety score. The procedure used was to examine the correlations of anxiety and achievement for Ss grouped by three levels of defensiveness, high, medium, and low, as shown in Figures 1 and 2. Inspection of the relationships illustrated in Figures 1 and 2 indicates that when both anxiety and defensiveness scores are relatively high, the correlation of anxiety and achievement is highest. With TASC (adj.) scores, the relationship is sufficiently high ($r = -.69$) as to suggest that anxiety has a major debilitating effect on achievement for Ss with this pattern of TASC and LSC scores. Previously, Hill and Sarason (1966) suggested that Ss high on both the TASC and LSC experienced the most debilitating emotional interference in the academic achievement situation when compared with Ss high on either the TASC or LSC alone. Evidence from this study indicated that approximately 48 percent of achievement variance was predictable from the adjusted anxiety scores of high defensive Ss, while the percentages for medium and low defensive Ss were, respectively, 14 percent and 15 percent.

Summary and Discussion

The major finding of the research showed that, when the predictive validities of TASC and TASC (adj.) scores were compared against the

Figure 1

Regression of Achievement on TASC
for Three Levels of Defensiveness

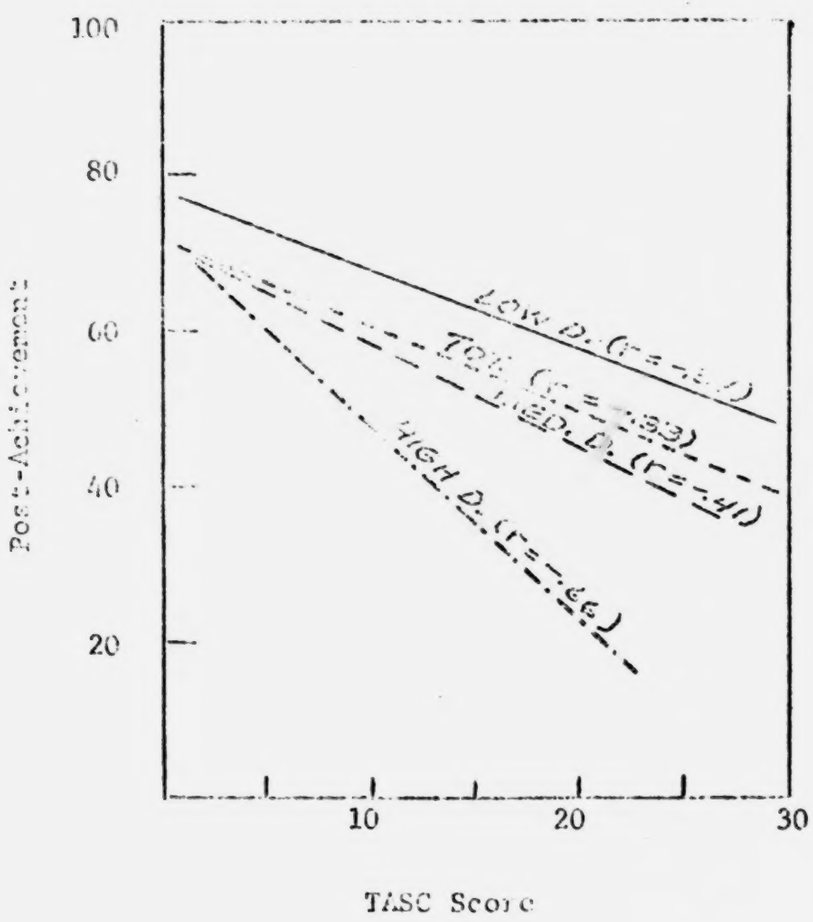
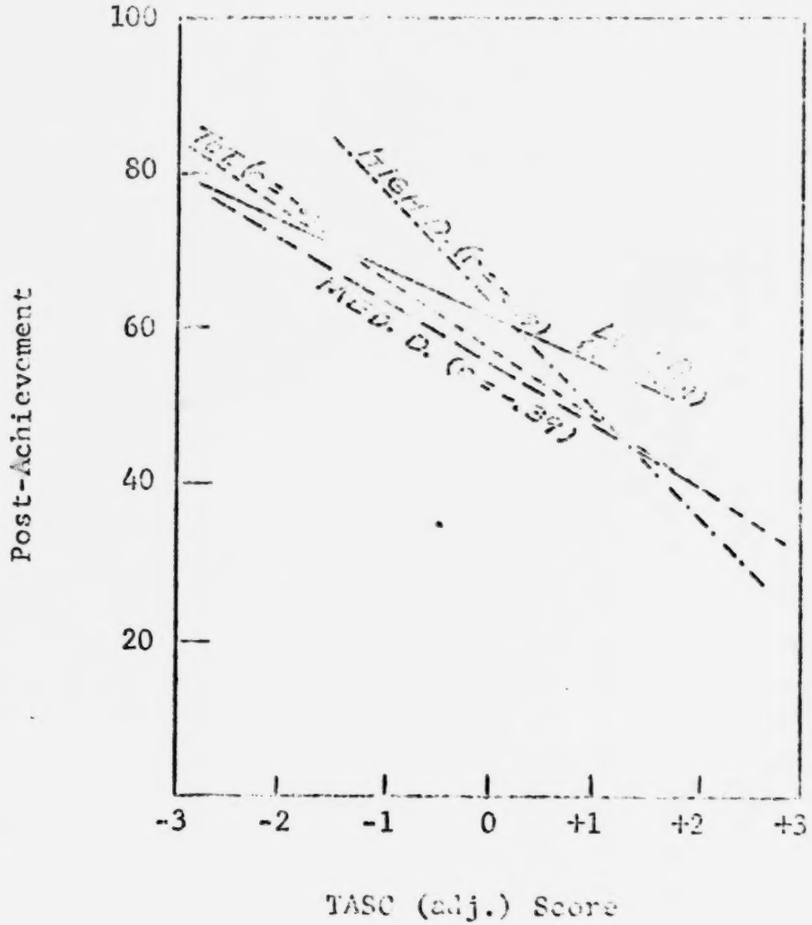


Figure 2

Regression of Achievement on TASC (adj.)
for Three Levels of Defensiveness



academic criteria available, the TASC (adj.) score resulted in substantial increases in prediction. The improvement for the achievement measure was approximately 16 percent, while for IQ, the improvement was 13 percent, and both increases in prediction were significant. When compared against teacher rankings of children's anxiety, the TASC (adj.) score showed some slight superiority over the TASC score in the anxiety, but there was no difference in the predictive validities of TASC and TASC (adj.) scores when the correlations of TASC and TASC (adj.) scores with teachers' anxiety ranks were averaged across teachers. Further comparisons of different methods used to improve the validity of TASC scores indicated that equal weighting of TASC and LSC scores is preferred to such methods as discarding Ss with high LSC scores (high liars), or partialling out the invalidating effect of LSC scores on the relationship between TASC scores and indexes of academic performance.

The findings of the study also provide further illumination of the psychological meaning of different patterns of anxiety and defensiveness scores, suggesting in general that the TASC (adj.) score measures not anxiety per se, but to some extent, the child's mode of defense against dibilitating anxiety. A high TASC score, coupled with a relatively low LSC score may be indicative of realistic appraisal of relevant cues, both internal and external, and may be associated with relatively effective coping mechanisms not specifically measured by the TASC, LSC, and similar scales. Hence the relatively low negative relationship between TASC scores alone, and indexes of academic performance. A relatively high LSC score coupled with a relatively low TASC score may indicate effective coping via denial of relevant external and internal cues in the academic situation.

That such relevant cues were present within the context of the testing and learning situations in this study may only be guessed at. However, it is not overly difficult to imagine such a child convincing himself that he is not anxious or afraid and availing himself of relevant teacher or peer stimulated cues which denied the threat value of the achievement test and other anxiety inducing stimuli present in this study.

The possibility that high TASC-low LSC and high LSC-low TASC score patterns may be indicative of modes of defense in children is suggested by experiments on anxiety and defense reviewed by Lazarus (1966). In one study of college students (Lazarus and Alfert, 1964), using questionnaire measures which paralleled the intent of the TASC and LSC, it was found that high deniers (high liars) exhibited higher levels of arousal under stress than those low on the denial tendency. High deniers were, however, able to effect a significant reduction in stress reaction when denial oriented cues were made available. In another study cited by Lazarus and Alfert (1964), a student group, high on admitted anxiety and low on denial, was relieved most by stimulus support representing intellectualization, but obtained little stress reduction under denial support. These findings are suggestive of the operation of similar defensive orientations with high TASC-low LSC and high LSC-low TASC score patterns.

The finding of this study that, <u>the higher the child's level of denial, the more important was his level of anxiety in determining achievement</u> is more difficult to explain (see Figures 1 and 2). However, examination of some additional data on the relative stabilities of TASC and LSC scores shown in Table 4 for <u>S</u>s in the three defensiveness groups considered may provide some illumination. These data indicate that the

tendencies represented by TASC and LSC scores were more stable for the high defensive group over the period of this research, with the degree of stability of TASC scores being especially marked. In the low and medium defensive groups, the denial tendency is virtually unstable, while the tendency to admit to anxiety tends to be moderately stable.

Table 4

Test-Retest Reliabilities of TASC and LSC Scores for Subjects in Three Levels of Defensiveness

	LSC Group		
	Low (N=72)	Medium (N=62)	High (N=31)
TASC	.72**	.72**	.89**
LSC	.32**	.29*	.63**

*p <.025

**p <.005

These data suggest that the TASC and LSC tendencies of Ss in the high defensiveness group are more consolidated and habitual relative to Ss in the other defensiveness groups. Further, the conflict suggested by the conjunction of both admission and denial of anxiety may indicate Ss who are continually on the verge of decompensation. In the face of stress which can no longer be denied, the result may be a large increase in dibilitating anxiety, as described by Lazarus (1966):

> If a defense is decompensating, that is being penetrated by the stimulus evidence which contradicts the defense and threatens to break it, anxiety is increased. In effect, as the evidence of threat grows and the defense is unsuccessful in maintaining a reappraisal of this evidence, anxiety mounts, sometimes to panic proportions. . . (p. 311).

The results of the comparisons of the predictive validities of TASC and TASC (adj.) scores further underline the importance of including measures of defensiveness in studies using questionnaire measures of anxiety with children. From a practical point of view, the findings offer a simple procedure for improving the predictive validity of questionnaire measures of anxiety. However, the generality of the findings of the regression analyses and the procedure for obtaining the TASC (adj.) score should be tested on additional samples of children before stable conclusions can be made. The explanatory framework regarding the psychological meaning of different levels and combinations of TASC and LSC scores must also be regarded as tentative, subject to further consideration and test.

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